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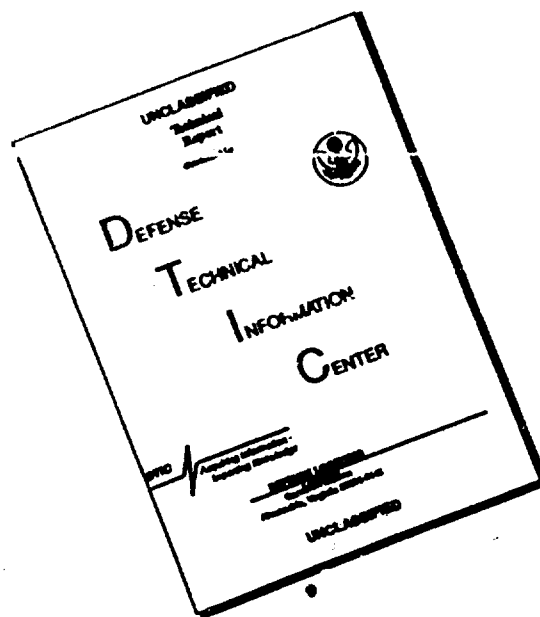
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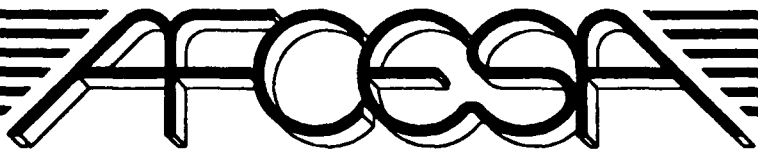


# **GROUNDS MANAGEMENT COST REDUCTION STRATEGIES**

**A QUALITY AIR FORCE  
INITIATIVE**

**JUNE 1993**

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED



AIR FORCE CIVIL ENGINEERING SUPPORT AGENCY  
139 BARNES DR, SUITE 1,  
TYNDALL AIR FORCE BASE, FLORIDA 32403-5319

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
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6. AUTHOR(S)  Mr Wayne Fordham				
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13. ABSTRACT (Maximum 200 words) A recent Quality Air Force initiative by HQ Air Force Civil Engineering Support Agency uncovered numerous ideas for cost-savings in the grounds management area. The final report on this project contains 74 ideas from Air Force personnel, seven proposals from other service agencies, and summation of 16 published articles. With the current trend of less funding, it is appropriate for grounds managers to consider new ideas for reducing labor, material, and equipment cost.				
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## **SECTION I**

### **INTRODUCTION**

#### **A. PROBLEM IDENTIFICATION**

A substantial portion of the Base Civil Engineer's budget goes toward upkeep of grounds. With the current trend of less funding it is appropriate for grounds managers to consider new ideas for reducing labor, material, and equipment costs.

While cost reductions are achievable, caution must be exercised to avoid adverse impacts upon aesthetics and the environment. An initiative using Quality Air Force concepts was chosen to uncover opportunities available for cost-savings in the grounds management area.

#### **B. FIELD SURVEY**

The process of developing this report began with a 7 August 1992 letter from HQ AFCESA/DM to ALMAJCOMs. This letter solicited innovative successful cost-saving ideas from base personnel responsible for in-house or contract grounds management programs.

In order to capture as many cost-saving ideas as possible other military services were asked to contribute to this project. Additionally, a comprehensive literature search was initiated to obtain ideas in publication common to this area of interest.



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## **SECTION II**

### **COST-SAVING IDEAS**

#### **A. AIR FORCE INPUTS**

Approximately 130 ideas were submitted by individuals at Air Force MAJCOMs and bases. These ideas were reviewed by a team of Air Force personnel who have approximately 70 years experience in military land management operations and procedures. The approved list of ideas from Air Force personnel is located at Appendix A. These 74 ideas have sound basis for accomplishing cost-savings on the bases on which they originated. The adoption of these ideas may be possible at other locations and should be discussed with the idea originator and/or local professionals before implementation is programmed.

Since many ideas have estimated savings and not actual saving it appears that often suggestions may have not been fully considered by senior management. The current trend to empower workers at lower levels should open the way for acceptance of initiatives from concerned workers who see opportunity for improved management practices.

#### **B. ARMY CONTRIBUTIONS**

Seven documents from Army sources are available for review at Appendix B. Reference documents B-1 and B-2 were produced by Waterways Experiment Station (WES) and are provided with abstracts and key page sections. Complete copies of these documents can be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield VA 22161. A complete bulletin from WES on using buffalograss for low-maintenance prairie restoration is at reference B-3

The other documents from the Army are accounts of good ideas at base level. Army land managers at Fort McLoy WI, Fort Sill OK, and Harry Diamond Labs in the Washington DC area obtained significant savings through reduction of mowing acreage. Methods to achieve similar savings in the Air Force are noted in Section IV.

#### **C. TRADE ARTICLE REVIEW**

A professor from the University of Georgia (Wade 1986 and 1990) is one of the best sources of information on low maintenance landscaping. He recommends that low maintenance be given consideration during the design, installation, and

management phases of landscaping operations. Achievement of these goals was obtainable on Oregon State University's grounds by use of an ad hoc committee that produced priorities and standards for campus operations (Cook 1985). Park facility operators in Massachusetts (Phillips 1990) were also successful with this strategy.

The importance of soil analysis, fertilizer type, fertilizer equipment calibration, and pesticide equipment calibration has been documented (Altman 1992). One way to stay current on these and other topics is to continue worker education by attending local workshops and seminars (Kerr 1979).

Semi-improved and unimproved areas in some midwestern locations can be converted to prairie type vegetation (Aungst 1986). In many states wildflowers are used to improve aesthetics and reduce mowing frequency (Kuennen 1986) and (Wilson 1990).

A review of equipment requirements should include options other than purchasing needed items. Using the correct size equipment (Abrahamson 1986) and leasing seldom used equipment (Buckingham 1986) can provide cost savings in some situations.

Water conservation has gained importance in many areas of the country. Careful selection of grass species (Ferrara 1992) and (Gibeault 1989) is essential to reducing water use and cost associated with irrigation.

Raising the height of mowing (Nelson 1990) and trial use of Plant Growth Regulators (PGRs) (Bolt 1988) are two options that warrant evaluation for cost savings on nearly all our bases.

Grounds managers should have access to local, regional, and national journals and newsletters so that current information on grounds management is available to them. These publications will increase opportunities for networking with workers in federal, state, and private sectors. MAJCOM program managers can assist base personnel in identifying useful periodicals. Another excellent source of information is the local Cooperative Extension Service. Many states have literature (Black 1976) available that supports local cost reduction efforts.

### SECTION III

#### SUMMARY

Information on each idea, including benefits and subject area is presented in the Summary Table. This table enables interested readers to quickly identify subjects of a particular concern and note how AFCESA/DMPS rated each idea for cost, aesthetics and environmental impact. More detail on each reference item is expanded upon in the correlating appendix number.

# SUMMARY TABLE

Benefit(s)

+ positive  
- negative  
0 neutral

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-1	+	-	+	mowing
A-2	+	0	0	stump removal
A-3	+	0	+	compost pit
A-4	+	0	+	compost pit
A-5	+	0	0	refuse collection
A-6	+	0	+	ground survey
A-7	+	+	+	mowing
A-8	+	-	0	flower beds
A-9	+	+	0	herbicides

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-10	+	+	0	mowing
A-11	+	-	+	mowing
A-12	+	+	0	edging
A-13	+	+	0	zone maintenance
A-14	+	+	+	hydroseeder
A-15	+	0	0	stump removal
A-16	+	0	0	unit maintenance
A-17	+	+	0	herbicides
A-18	+	+	+	irrigation

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-19	+	+	+	equipment maintenance
A-20	+	+	+	soil sampling
A-21	+	0	0	contracts
A-22	+	-	+	grounds classification
A-23	+	0	0	hydroseeder
A-24	+	0	+	mowing
A-25	+	0	0	unit maintenance
A-26	+	0	0	mowing
A-27	+	0	0	contracts

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-28	+	+	+	wildflowers
A-29	+	0	0	mowing
A-30	+	+	+	seeder
A-31	+	+	0	edging
A-32	+	0	+	contracts
A-33	+	+	+	planting selection
A-34	+	+	0	drainage
A-35	+	0	0	equipment rental
A-36	+	0	+	equipment placement



# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-37	+	0	0	contracts
A-38	+	+	+	plant selection
A-39	+	+	0	herbicides
A-40	+	0	0	PGRs
A-41	+	+	+	plant selection
A-42	+	+	+	plant selection
A-43	+	+	+	plant selection
A-44	+	0	+	mowing
A-45	+	0	0	PGRs
				.

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-46	+	0	0	PGRs
A-47	+	-	+	mowing
A-48	+	0	+	mowing
A-49	+	-	0	raking
A-50	+	0	+	reforestation
A-51	+	-	0	flower beds
A-52	+	-	+	mowing
A-53	+	-	+	mowing
A-54	+	0	0	PGRs

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-55	+	+	+	plant selection
A-56	+	+	+	mowing
A-57	+	0	0	zone maintenance
A-58	+	+	+	watering
A-59	+	-	+	watering
A-60	+	0	0	contracts
A-61	+	0	0	PGRs
A-62	+	+	+	plant selection
A-63	+	+	0	plant selection

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-64	+	+	+	wildflowers
A-65	+	+	+	mulching mowers
A-66	+	0	+	equipment
A-67	+	+	0	herbicides
A-68	+	+	+	airfields
A-69	+	+	+	mowing
A-70	+	0	+	ag outleases
A-71	+	+	+	mulching
A-72	+	+	0	plant selection

# SUMMARY TABLE

Benefit(s)

Reference #	Cost	Aesthetics	Environmental	Subject Area
A-73	+	0	0	unit maintenance
A-74	+	+	+	networking

# SUMMARY TABLE

Benefit(s)

+ positive  
- negative  
0 neutral

Reference #	Cost	Aesthetics	Environmental	Subject Area
B-1	+	+	+	WES report
B-2	+	+	+	WES report
B-3	+	+	+	WES bulletin
B-4	+	+	+	tumbleweeds
B-5	+	0	+	mowing
B-6	+	+	+	Ft Sill's article
B-7	+	+	+	Adelphi's article

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## SECTION IV

### CONCLUSION/RECOMMENDATIONS

#### A. CONCLUSIONS

The response to AFCEA/DM's 7 August 1992 letter was outstanding and demonstrates the genuine interest that Air Force ground managers have for their area of work. This evidence of concern for well kept grounds is visibly obvious on nearly all Air Force bases.

The multitude of ideas presented in this report clearly indicates that there is not a shortage of initiatives to choose from in developing cost reduction strategies.

#### B. RECOMMENDATIONS

The idea of eliminating non-essential mowing areas is mentioned frequently in this report. This idea will provide the largest cost savings and will also allow bases to achieve multiple environmental benefits. Less mowing means reduced noise and emissions, less pesticide application, and reduced fertilizer contamination of groundwater.

Establishing and empowering a Grounds Management Committee (GMC) to actively evaluate the existing grounds management program is strongly recommended. Membership on the GMC is critical to the success of this opportunity. Most important is to have a command representative actively involved with the decision making process of the GMC. Other GMC members should include in-house or contract management personnel responsible for daily grass mowing activities, natural resource representatives, engineers, safety officers, and landscape architects. The GMC should map all mowed areas, establish criteria for areas to be mowed, and then eliminate those areas not meeting the criteria. Often acreage can be eliminated from the mowing schedule and many areas can be mowed less frequently.



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<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
A-1	Remove 800 acres from mowing and implemented scultures mowing lines.	A - \$50,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

<b>POINT OF CONTACT(S) (Address)</b>	1Lt Parmenter, TSgt Trebil & TSgt Shimpa 319 GEOE Grand Forks AFB ND 58204
<b>(Phone No.)</b>	DSN 362-5714/4608

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
A-2	Grind tree stumps instead of removing them.	E - \$ 6,500
A-3	Provide contractor a compost pit. Allow base residences to use compost.	E - \$ 4,600
A-4	Also allow contractor to use compost in lieu of commercial fertilizer.	E - \$ 1,300
A-5	Allow contractor to use base dumpsters for reuse collection from policing operations.	E - \$ 1,200

POINT OF CONTACT(S) (Address)	Mr Bazzan 24 CES/DEV Howard AFB Panama
(Phone No.)	0-284-5165

**A-6-10**



**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**      **Mr McClanahan**  
     **(Address)**                **305 CES/DEMH**  
                                  **Grissom AFB IN 46971-5000**

**(Phone No.)**            **DSN 928-4540**

<u><b>IDEA(S)#</b></u>	<u><b>BRIEF EXPLANATION</b></u>	<u><b>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</b></u>
A-11	Reduce standard on 55 acres of mowing area.	A - \$ 5,295
A-12	Improved sidewalk edging/trimming on 75,000 LF by attaching a straight edge disk to a 60" rotary mower and ride cutting these areas.	A - \$ 35,010
A-13	Break base into areas assigning personnel and equipment. Keep same people with the same equipment, a personal ownership type thing. The personal competition pays off by who has the best area. Another comment if the grounds are rough the guy that rides that area is the person to fix the grounds. The personal ownership pays off big time. Grissom is still operating the same group of 72" rotary mowers that were purchased in 1981 and 1982 without a major mechanical failure and some of these mowers have in excess of 4,000 engine hours. This innovation was planned on a 10-year cycle meaning after the first cycle, replace mowers at a rate of two per year for the next 10 years.	A - \$25,230

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GROUNDS MAINTENANCE COST REDUCTION IDEAS**

POINT OF CONTACT(S) (Address)	Mr Block 410 SG/DEMH-H 400 C Ave., Ste 100 K I Sawyer AFB MI 49843-3200
(Phone No.)	DSN 492-1419

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-14	Obtain hydroseeder to repair plow damage and upgrade improved grounds.	E - \$ 3,700
A-15	Obtain stump grinder and save on removal cost.	E - \$ 2, 460
A-16	Ensure that units establishings obstacles to grounds maintenance be tasked to maintain the areas around these obstactles.	None provided
A-17	Establish a proper herbicide program for cantonement and secure areas, fences, and on the aerodrome. Saves on weedeating lost.	E - \$14,800
A-18	Install automated sprinkler systems	E - \$ 7, 400
A-19	Establish an extensive and envolved operator's maintenance and care program for all grounds equipment to ensure maximum available use-time and minimum downtown through lack of maintenance. Savings are extensive without available dollar figure.	None provided

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(Phone No.)      DSN 682-3107/5286

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
A-20	Have soil samples taken so you do not use the wrong fertilizer type or amount.	None provided

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**POINT OF CONTACT(S)  
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Mr Horne  
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**(Phone No.)**

DSN 781-3317

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

A-21

Our plan is to list many current items as line items so we will be better able to manage our funds within the contract.

E-\$ 39,811.22

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)      TSgt Alvarez  
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93 CSG/DEEC  
Castle AFB CA 95342

(Phone No.)      DSN 347-4476/7

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-22	Change improved areas to semi-improved or unimproved areas.	
A-23	Reduce special request-have all work request go thru the QAE.	
A-24	Reduce frequency of service and relax tolerance on grass height from 2" to 5" vs 2" to 4".	Combined saving A-22-24, E-\$100,000
A-25	Have dorm personnel cut/water their own grass.	E-\$ 1,440

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

Mr Coppalo  
23 CES/CER  
Pope AFB NC 28308

**(Phone No.)**

DSN 486-4514

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

A-26

Stop overtime for moving at air-  
field and change to early morning  
hours.

E \$ 3,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**      **Capt Shea**  
    **(Address)**              **67 CES**  
                                 **Bergstrom AFB TX 78743-5000**

**(Phone No.)**              **DSN 685-2623**

<b><u>IDEA(S)#</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) BRIEF EXPLANATION</u></b>	<b><u>YEARLY \$ SAVINGS</u></b>
<b>A-27</b>	<b>We have set up our grounds contract for FY93 with unit pricing for each different type of service. With this in place we have a set unit cost which facilitates quick and easy modifications at a predetermined price. Not only will this save directly on the cost of service, but there is also a substantial indirect saving in time and administrative manhours required to put the modifications into effect. We have further streamlined this process by developing a spreadsheet that calculates the cost automatically as the individual units of works are modified.</b>	<b>None provided</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

**Mr Taylor  
416 CES/CEI  
Griffis AFB NY 13441**

**(Phone No.)**

**DSN 587-4664**

**IDEA(S):**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

**A-28**

**Plant wildflowers to reduce grounds  
maintenance cost.**

**To be determined**



**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)      Mr Clapper  
                         351 CES/DEM  
                         Whiteman AFB MO 65305

(Phone No.)      DSN 975-6393

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-29	Use mowers with side hydraulic wings gives the operator a total of 12 feet of cutting operation.	E-\$13,451.20
A-30	Use a turfshaper which tills, levels, and seeds all in one operation.	E-\$16,013.33
A-31	Eliminate the use of borders along flower beds and landscaping projects so small mowers can move along the edge and eliminate weedeating.	E-\$ 7,206

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)                      Mr Cone  
                                    442 SPTG/CESC  
                                    Richard-Gebaur AFB MO 64147-5000

(Phone No.)                      DSN 463-2479

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-32	Reduce amount of cutting requirements and move tasks to a requirement basis.	None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)                      Mr Scott  
   45 GES/DEM  
   Patrick AFB FL 32925

(Phone No.)                      DSN 854-4932

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
A-33	Purchase plants that are native to the area.	None provided
A-34	Install drainage pipes in ditches and canals to eliminate requirements for a slope mower.	None provided
A-35	Rent equipment instead of buying it when needs are infrequent.	E-\$ 2,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

TSgt Michalik  
Det 4, 750 SGP  
Box 228  
AE 09815

**(Phone No.)**

DSN 561-3000 Ext 304

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

A-36

Stage equipment to save transporting  
it.

None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address) Mr Calvert  
18 CES/DEECS  
Kadena AB  
Okinaua Japan

(Phone No.) DSN 634-0766

<u>IDEA(S)f</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-37	Delete turf repair, seeding, hydro seeding, and sodding from the general contract and use a blanket purchase agreement on or as required basis, when identified by the DAE or shop personnel.	None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

<b>POINT OF CONTACT(S) (Address)</b>	<b>Mr Ladagard 3 CES/DEMRH 22040 Maple Street Elemendorf AFB AK 99506-3240</b>
<b>(Phone No.)</b>	<b>(317) 552-2994/5</b>

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
<b>A-38</b>	<b>Select right plant or tree for specific location.</b>	<b>None provided</b>
<b>A-39</b>	<b>Apply anti-weed germization granules to flower beds.</b>	<b>None provided</b>
<b>A-40</b>	<b>Use Plant Growth Regulators (PGRs) on semi-improved grounds.</b>	<b>None provided</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

<b>POINT OF CONTACT(S) (Address)</b>	<b>MSgt Derk 15 CES/DEMES Bldg 1204 Hickam AFB HI 96853-5000</b>
<b>(Phone No.)</b>	<b>(808) 448-0565</b>

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
<b>A-41</b>	<b>Develop a list of authorized trees and shrubs that can be planted, focusing on low maintenance types.</b>	<b>None provided</b>
<b>A-42</b>	<b>Do not allow military family housing occupants to plant any trees without CE site approval.</b>	<b>None provided</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

<b>POINT OF CONTACT(S) (Address)</b>	<b>Mr Buckman HQ PACAF/DEVP Hickam AFB HI 96853-5001</b>
<b>(Phone No.)</b>	<b>(808) 449-9695</b>

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
<b>A-43</b>	<b>In the northeastern US hydroseed crown vetch with nurse crops (annual rye).</b>	<b>None provided</b>
<b>A-44</b>	<b>For off road non-essential areas, redesignate as wildlife habitat and plant or leave follow as appropriate.</b>	<b>None provided</b>
<b>A-45</b>	<b>Use PGRs in semi-improved areas with little foot traffic.</b>	<b>None provided</b>



**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)                      SMSgt Berube  
                                     8th CES/DEMP  
                                     Kunsan AB ROK  
                                     PSC #2 Box 443

(Phone No.)                      DSN 782-4143

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A)</u> <u>YEARLY \$ SAVINGS</u>
A-46	Use PGRs on airfields.	\$ 50,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)      **Capt Taylor**  
                    **3345 CES/DEMR**  
                    **Chanute AFB IL 61866**

(Phone No.)      **DSN 867-2618**

<u><b>IDEA(S)#</b></u>	<u><b>BRIEF EXPLANATION</b></u>	<u><b>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</b></u>
<b>A-47</b>	Add more unimproved grounds around outlying areas where most people won't see. (Some people will try to pressure you into putting the area back into the contract. Commander's approval is essential).	
<b>A-48</b>	Reduce frequency of cuts to one every 10 to 12 days rather than 7 days.	
<b>A-49</b>	No raking of improved grounds (reduce scope of enhanced areas).	<b>Total saved was \$ 157, 619</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

<b>POINT OF CONTACT(S) (Address)</b>	Mr Sudduth 14 CES/DEEC Columbus AFB MS 39701-5000
<b>(Phone No.)</b>	DSN 434-7966

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) - YEARLY \$ SAVINGS</u></b>
A-50	Turn semi-improved areas into forest.	E-\$ 12,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

**Lt Mittelstadt  
3498th CES/DEME  
Goodfellow AFB TX**

**(Phone No.)**

**DSN 477-5284**

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

**A-51**

**Stop flower beds**

**E-\$ 2,000**

**A-52**

**Down-grade some improved  
grounds areas to semi-improved.**

**E-\$ 13,200**

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address) 3700 CES/DEM  
1940 Gary Avenue  
Lackland AFB TX 78236-5512

(Phone No.) DSN 671-3015

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-53	Minimize the area considered improved areas.	None provided
A-54	Determine whether PCR's can be effectively used to reduce grass cutting.	None provided
A-55	Increase use of low maintenance landscaping—especially in high trimming areas such as traffic islands and between walks and roadways.	None Provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
**(Address)**  
Capt Petryszt  
47 CES/DEM  
Laughlin AFB TX 78843-5000

**(Phone No.)** DSN 732-5214

<u><b>IDEA(S)</b></u>	<u><b>BRIEF EXPLANATION</b></u>	<u><b>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</b></u>
A-56	Use mulching mowers.	None provided
A-57	Divide distinguished visitor areas for various routes.	None provided
A-58	Decreasing watering requirements by not over watering.	None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)                      **Mr Dennis**  
                                    **323 CES/DEM**  
                                    **Mather AFB CA 95655**

(Phone No.)                      **DSN 674-2589**

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A)</u> <u>YEARLY \$ SAVINGS</u></b>
<b>A-59</b>	<b>Transferred 16 acres of improved irrigated to improved unirrigated.</b>	<b>None provided</b>
<b>A-60</b>	<b>Base grounds maintenance contract is base on a requirement rather than finite schedule. This action greatly reduced mowing in semi-improved and airfield areas.</b>	<b>None provided</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

**Mr Cohlma  
Vance AFB OK 73705-5000**

**(Phone No.)**

**DSN 940-6079**

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

**A-61**

**Using a PGR we implemented a bermuda  
release and reduced mowing require-  
ments.**

**None provided**



**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address) Kay Pepper  
82 CES/DEEM  
Williams AFB AZ 85240

(Phone No.) DSN 474-6253

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-62	Converted many areas to desert/rock landscaping.	None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

POINT OF CONTACT(S)  
(Address)                      Mr Moran  
   432 SPTG/DEMC  
   McGire AFB NJ 08641-5000

(Phone No.)                      DSN 440-5063

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u>
A-63	All self-help landscaping projects must be approved by a control agency within CE with maintenance to be determined at that time.	None provided
A-64	Consider using wildflowers.	None provided
A-65	Use mulching mowers.	None provided

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
(Address)                      TSgt Singleton  
                                    60 CSG/DEMWE  
                                    Travis AFB CA 94535-5000

(Phone No.)                      DSN 837-3033

<u>IDEA(S)#</u>	<u>BRIEF EXPLANATION</u>	<u>ESTIMATED(E) OR ACTUAL(A)</u> <u>YEARLY \$ SAVINGS</u>
A-66	Use motorized scooters instead of full size trucks to transport personnel and light weight equipment.	E-\$ 300.00

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

Mr Noel  
380 CES/DEMG  
Plattsburg AFB NY 12903-5000

**(Phone No.)**

DSN 689-7020

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

A-67

Use herbicides around telephone poles, under fences and next to buildings.

E-\$ 3,000

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
**(Address)**                      **Mr Calvert**  
                                      **375 AW/EMO**  
                                      **Scott AFB IL 62225-5000**

**(Phone No.)**                      **DSN 576-6569**

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A)</u> <u>YEARLY \$ SAVINGS</u></b>
<b>A-68</b>	<b>Increases paved area around runway lights to eliminate trimming and reduce weed control.</b>	<b>E-\$ 10,000</b>
<b>A-69</b>	<b>Maintain correct height of grass.</b>	<b>E-\$ 50,000</b>
<b>A-70</b>	<b>Lease out open areas for agriculture.</b>	<b>E-\$ 10,000</b>
<b>A-71</b>	<b>Mulch around all trees, reduces trimming and protects trees.</b>	<b>E-\$ 10,000</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)  
(Address)**

**MSgt Skipper  
437 CES/DEM  
Charleston AFB SC 29492**

**(Phone No.)**

**DSN 858-5268**

**IDEA(S)#**

**BRIEF EXPLANATION**

**ESTIMATED(E) OR ACTUAL(A)  
YEARLY \$ SAVINGS**

**A-72**

**A lot of displays are nice to have,  
but are labor intensive to maintain.  
We need to make sure these areas are  
approved by professionals before others  
sign-off on them.**

**None provided**

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**      **MSgt Taylor**  
    **(Address)**              **65 CES/DEMWE**  
                              **APO NY 09720 (Lajes Fld, Azores)**

**(Phone No.)**              **DSN 725-4170**

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A) YEARLY \$ SAVINGS</u></b>
<b>A-73</b>	<b>Make using organizations responsible for more areas around their facilities. We spend too much time on gardeners.</b>	<b>None provided</b>

**AIR FORCE  
GROUNDS MAINTENANCE COST REDUCTION IDEAS**

**POINT OF CONTACT(S)**  
**(Address)**                      **Mr Paterno**  
                                      **436 CSG/CECP**  
                                      **Dover AFB DE 19902-5516**

**(Phone No.)**                      **DSN 445-6813**

<b><u>IDEA(S)#</u></b>	<b><u>BRIEF EXPLANATION</u></b>	<b><u>ESTIMATED(E) OR ACTUAL(A)</u></b> <b><u>YEARLY \$ SAVINGS</u></b>
<b>A-74</b>	<b>Use state forester for identification of trees that require removing or pruning.</b>	<b>None provided</b>



TECHNICAL REPORT EL-91-16

# **GROUNDS MAINTENANCE: STANDARDS, PRACTICES, AND ALTERNATIVES**

by

**Linda D. Peyman-Dove**

**Environmental Laboratory**

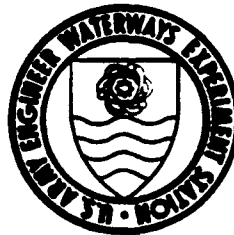
**DEPARTMENT OF THE ARMY**

**Waterways Experiment Station, Corps of Engineers  
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199**

and

**Bonnie S. Martin**

**Clemson University  
Clemson, South Carolina 29631**



**December 1991**

**Final Report**

**Approved For Public Release; Distribution Is Unlimited**

**Prepared for US Army Engineering and Housing Support Center  
Fort Belvoir, Virginia 22060-5516**

**B-1**

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13. ABSTRACT (Maximum 200 words)  This report focuses on practices that offer opportunities to reduce mowing and other grounds maintenance costs. The primary practices that will be discussed include the use of low-maintenance vegetation, such as wildflowers and native grasses, and the use of chemical control, such as plant growth regulators.  A questionnaire was developed and distributed to Army installations and other public land use agencies to compare the Army's mowing standards and practices to those of other agencies. Questionnaire results are summarized in this report.				
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14. (Concluded).

Chemical mowing	Native grasses	Wildflowers
Grounds maintenance	Native vegetation	
Low-maintenance vegetation	Plant growth regulators	

## PART V: CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

94. The findings of this report lead to several conclusions. First, as previously stated, the question that this report addresses is: "How does the Army compare to other public land-use agencies in its grounds maintenance standards, and practices?"

95. According to the results of the questionnaire, the answer is complex. The findings indicate that Army installations are mowing a substantially higher percentage of their area than are the other agencies. On the other hand, the Army is generally mowing at the same turf height and the same roadside footage as all the other agencies. Of all the agencies, the Army reports a higher increase over the past 5 years in the amount of its improved grounds that are being mowed. However, this seems to reflect changes in land use rather than changes in maintenance standards. The reported decrease in amount of semi-improved area being mowed by the Army may be an indication of changes in maintenance practices.

96. It is interesting to note that the Army responses indicate that their cost per acre to mow is lower than all other agencies except for the universities. This may or may not be true. Several respondents inserted notes on the questionnaire that indicated confusion as to what was to be included in their maintenance cost. Unfortunately, this leads to the conclusion that cost determination by the different respondents may not be consistent and, further, to the supposition that a proper comparison has not been made.

97. Low-maintenance vegetation is not being used by as high a percentage of Army respondents as by respondents from other agencies. Only the National Park Service reports a similar low percentage of respondent use as the Army. However, the NPS respondents frequently referred to the need to preserve historical authenticity as their reason for not changing to low-maintenance vegetation, a constraint that is not applicable to Army installations. Several Army respondents pointed out that the initial cost of establishment was prohibitive. The actual percentage of the total acreage with low-maintenance vegetation is quite low in all agencies, except the Corps of Engineers.

98. While public reaction to use of low-maintenance vegetation on Army installations seems to be similar to that of the other agencies, Army administrators show the least positive reaction when compared to all the other agencies. This can be explained by the comments made by several of the Army respondents. While one respondent mentioned that administration seems to be coming around to a more positive outlook as long as specific areas are intensely maintained, this was not the general consensus. Many Army respondents referred to the typical military attitude that desires a highly manicured look for the entire installation. Since this attitude may be standing in the way of progressive changes that would lead to lower grounds maintenance costs, an incentive program may solve the problem. Perhaps if the Community of Excellence Award were to include, as part of its criteria, the use of native vegetation, low-maintenance vegetation would become more attractive to Army Commanders.

99. Although the attitude that favors highly manicured grounds still seems to be prevalent, the Army does seem to be the leader in one innovative land use that results in lower maintenance. More Army respondents listed outleasing programs for agricultural hay harvesting than any other agency. This is especially interesting in light of the recommendations made to the Army in 1984 by a Review Team who evaluated Army natural resource management programs on military installations and civil works projects. It was recommended that the Army "reduce, where possible, the frequent mowings of large cantonment acreages and other associated open areas to curtail maintenance costs on both installations and projects." One of the ways suggested for accomplishing this was to arrange for haying licenses and/or leases. Another suggestion was for the increased use of native plants. This suggestion does not seem to have been taken as seriously as the one for haying licenses.

100. The use of PGRs by the Army for controlling grounds maintenance costs is extremely limited. Since State Highway Departments are successfully using PGRs on both improved grounds and roadsides, the Army may be able to benefit from this experience. As the literature (and several respondents) suggests, PGRs have greatly improved over the past few years. Some of the reasons cited for not using PGRs may point to a general lack of information about their effectiveness and recent improvements. It also seems evident that negative perceptions are based on experimental past use that may not be accurate in light of today's improved formulas.

101. Although the Army reports the highest percentage of positive administrative reactions of any of the agencies, it must be noted that many respondents stated that administration officials usually are not aware of PGR use. This probably explains why there is little negative reaction or no reaction at all. Since many respondents who were using PGRs found them to be effective in reducing grounds maintenance costs, the Army needs to seek more information about their use. Many respondents expressed their concern about the environmental effects of PGR use, about PGR effects on turf, and about cost effectiveness. This indicates a need for better information exchange.

102. Herbicide use by the Army is very similar to use by the Corps of Engineers, but less than use by the universities, and much less than that of State Highway Departments. The Army uses herbicides mainly for weed control and to reduce mowing costs, just as the other agencies do.

103. The Army respondents report little public or administrative reaction to their use of herbicides. The negligible amount of public reaction can probably be explained by the fact that the public rarely knows what the Army is doing within the confinement of the installations. Positive administrative reaction within the Army was attributable to improved appearance and cost savings.

104. The questionnaire elicited additional responses that suggest two other innovative techniques for lowering maintenance costs. A National Park Service respondent mentioned his use of a computerized maintenance management system for planning and evaluating maintenance practices and costs. This type of system would permit cost tracking of maintenance practices, giving grounds maintenance personnel accurate information on where funds are being spent and thus where funding cuts could best be made. An Army respondent reported a method of mapping all mowed areas, establishing criteria for areas to be mowed, and then matching areas with criteria. Areas meeting none of the criteria were designated "no-mow" areas and eliminated from the mowing cycle. These areas totaled 640 acres. These two ideas should stimulate the interest of those concerned about reducing maintenance costs.

105. Several topics for further research related to grounds maintenance were suggested by Army respondents. First, many respondents are interested in information on PGRs. Others mentioned an interest in additional information about wildflowers and soil aeration. Another interesting suggestion came from an Army respondent who commented that no questions had been asked about unimproved grounds. He states, "This program should be expanded in order to

maintain training areas.. Without proper maintenance, training areas will degenerate and be incapable of providing quality training in future years."

### Recommendations

#### Develop cost-tracking methodology

106. Cost-effectiveness is essential for determining grounds maintenance strategy. Therefore, it is important to know the cost associated with existing grounds maintenance operations. One survey reports that only 24 percent of grounds maintenance managers across the country could provide a per-acre mowing cost (Watschke, Lyman, and Prinster 1988). Managers must know where their money is being spent in order to find the most effective means of saving it.

107. The questionnaire discussed in this report attempted to determine mowing costs, costs and benefits associated with low-maintenance vegetation establishment, and the price and cost savings associated with PGRs and herbicides. However, the few cost figures that were received varied so tremendously that the validity of the figures was questionable. This lack of, and variance of, existing cost information leads us to believe that there is a need for a better understanding of the money that is being spent on various grounds maintenance practices. Development and implementation of a system to track costs of performing these activities is recommended.

#### Reduce mowed areas

108. This recommendation results from a practice currently under way at an Army installation. This installation mapped all mowed areas, established criteria for areas to be mowed, and then eliminated those areas not meeting the criteria. While some acreage could be eliminated from the mowing schedule, other acreage could be mowed less frequently. To realize immediate cost-saving opportunities, implementation of this type of practice is recommended at other installations.

#### Test cost-effectiveness of low-maintenance vegetation

109. The indications are that low-maintenance vegetation may also offer an excellent opportunity to reduce long-term costs. The findings from the questionnaire and literature review give the overall perception that the use of low-maintenance vegetation has the potential for long-term cost savings. There is, however, a lack of documented case studies that track the actual

cost savings associated with low-maintenance vegetation. It is recommended that the Army consider testing low-maintenance vegetation, using appropriate vegetative species in different geographical areas. The costs associated with establishment and maintenance of vegetation that requires minimal maintenance could be tracked and compared with existing maintenance costs. The "no-mow" concept, in which nature is allowed to take its course, has immediate cost savings and would not be tested.

Support the use of  
low-maintenance vegetation

110. Army administrators should support the use of natives and natural areas, not just as a long-term means to cut grounds maintenance costs, but also to improve wildlife habitat and lessen the need for irrigation, herbicides, pesticides, and fertilizers. The Community of Excellence Program is a potential vehicle to encourage this support. A hands-on training course would be very useful for those not familiar with the most cost-effective establishment and maintenance methods for wildflowers, native grasses, and other low-maintenance vegetation. The Army should also continue its outleasing programs for agricultural hay harvesting in areas appropriate for that activity.

Provide more information on PGRs

111. The US Army Engineer Waterways Experiment Station (WES) has recently completed a 3-year study dealing primarily with the cost-effectiveness of plant growth regulators in reducing the need for mowing. Although the report is not complete, the general findings appear to be favorable, as were findings from the questionnaire discussed herein and a literature review. The Army has recently developed a "one-stop" program, where WES can provide interested Army installations with help in establishing PGR use at their installation. Army installations need further information concerning the environmental effects of PGRs and the long-term effects PGRs have on turf. The Army may benefit from State Highway Departments that have used PGRs on a sizable acreage for extended years. It is recommended that studies continue to determine fully the efficiency of PGRs and environmental impacts associated with their use.





**NATURAL RESOURCES  
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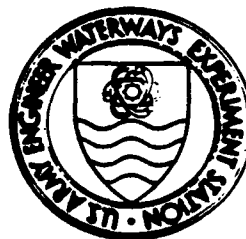
INSTRUCTION REPORT R-86-2

**FIELD GUIDE FOR LOW-MAINTENANCE  
VEGETATION ESTABLISHMENT  
AND MANAGEMENT**

by

Environmental Laboratory

DEPARTMENT OF THE ARMY  
Waterways Experiment Station, Corps of Engineers  
PO Box 631, Vicksburg, Mississippi 39180-0631



December 1986

Final Report

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<p>This field guide was written primarily for natural resource and project managers of Corps of Engineer (CE) reservoir projects who are faced with the increased costs of establishing and maintaining vegetation. The guide is also applicable to other types of project areas. It was designed to serve as an immediately available reference for the resource manager who may not have had an extensive background in soil and plant science.</p> <p>A flow diagram that guides the manager through problem assessment and problem-solving information is included in each of the five parts. Part II guides the manager through steps and checklists for cataloging, defining, locating, and quantifying vegetation problems. Part III presents basic considerations that will allow the manager to identify resource data needs and make observations which generally identify vegetative establishment and maintenance problems.</p> <p style="text-align: right;">(Continued)</p>					
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18. SUBJECT TERMS (Continued).

CE project lands	Soils	Vegetation
Low-maintenance vegetation	Vegetation establishment	restoration
Maintenance cost reduction	Vegetation management	

19. ABSTRACT (Continued).

Part IV assists the manager in assessing whether necessary resource data bases are available and which procedures are necessary to obtain this information. Part V provides low-maintenance strategies and information to aid the manager in identifying major climatic zones of the project area and in selecting and using vegetation types (i.e., grasses, shrubs, trees). Part V also addresses special problems, erosion control, and off-road vehicle strategies.

This guide is intended for use by CE natural resource personnel in selecting and maintaining appropriate vegetation types for certain soil, terrain, and site uses. It addresses use of desirable, low-growth, low-maintenance vegetation species applicable to CE project areas. Application of these procedures could lower overall project costs by eliminating expenditures on inappropriate vegetation and physical structures.

### Implementation of Strategies

139. Implementation of low-maintenance vegetation strategies will require developing an overall management plan for the project. Depending upon soils, vegetation, and the amount of use, cultural practices will have to be adjusted to the specific situation (Martin 1973) and can be intensified or decreased depending on the available budget. For example, if high-quality turf is desired, additional, more labor-intensive maintenance practices will probably be necessary.

140. A complete shift to a low-maintenance vegetation program may require complete renovation of the site and substitution of plant species. Although this would increase initial costs, long-term costs would be less. Resource managers should recognize that with a little extra effort, existing areas can be brought under a low-maintenance program. Of major importance is an assessment program developed around an adequate record-keeping system. Records are an important tool to improve upon past operations and to show where deficiencies or excesses exist.

#### Assessment parameters

141. Some suggested items for assessment record-keeping include: contract costs, equipment maintenance completed during winter months, seed and fertilizer purchased and stored, soil tests completed, shrubs or trees ordered, mowing dates, seasonal seeding dates, fertilizer application dates, and rotation of high-use areas. Records should be stratified by recreation use areas, i.e., picnic areas, campgrounds, or roadways. These kinds of data will show where high-cost maintenance areas are located. By reducing mowing width to within 5 m of road shoulders, for example, mowing costs could be reduced. The substitution of low-maintenance plants such as crown vetch on steep slopes will reduce costs by eliminating mowing altogether and could reduce the area to be mowed through a deferred mowing program.

#### Soil surveys

142. Soils are an integral part of our environment and can be defined as discrete bodies which are products of interactions between climate, time,

surficial geologic materials, vegetation, and topography. Soils will vary greatly from place to place, often over short distances, depending upon the landscapes and geologic history of the region. Soil scientists over the past 80 years have developed procedures to classify and record observations about soils. These data are compiled into soil survey reports which are state-of-the-art documents describing the soils of an area as well as interpretations about the use of soils for a number of different purposes. These include productivity soil ratings, land evaluation, and soil management recommendations for forestry, wildlife, recreation, agriculture and pasture production, and engineering use of soils for buildings and sewage lagoons.

143. Soils are rated by importance of benefit to soil survey users. Ratings for proposed uses are given in terms of limitations and restrictive features (slight, moderate, or severe). A slight rating is given to soils that have properties favorable for the intended use and in situations where good plant performance and low maintenance can be expected. A moderate rating indicates limitations for a particular use, but the limitations can be overcome or modified by special planning, design, or maintenance. A severe rating is given to soils that have one or more properties unfavorable for an intended use, for example, where high water tables or steep slopes limit equipment accessibility.

144. Most soils can support some kind of recreational activity. Some soils have no limitations for a specific kind of recreational use while others have moderate to severe limitations. The effects of different soil properties often vary with different uses. Soils subject to flooding have a severe limitation for campsites and should be used for hiking trails or greenbelts. Droughty soils are unsuitable sites for high-use areas such as playing fields since grass cover is difficult to establish and maintain. Wet soils will fail to support structures such as access roads, trails, and buildings. Soil surveys should be used to aid in site use determination.

#### Grasslands

145. Over the past several decades, more than 70 Kentucky bluegrass cultivars and 48 red fescue cultivars have been developed for turfgrass use (Beard 1972). The selection of grasses for use as turf in recreation areas depends upon several important criteria: (a) amount of shade, (b) level of management, (c) rainfall, (d) climatic conditions, (e) soil, and

(f) topography. For low-maintenance grasses, the following characteristics of each species should be considered:

- a. Low-growing growth habit.
- b. Short stolon internodes.
- c. High tiller internodes.
- d. Narrow leaf texture.
- e. Reduced rate of vertical leaf extension.
- f. Hardy in extremely cold weather.
- g. Buds out early in the spring.
- h. Disease and insect resistant.
- i. Acceptable cost.

146. Development of any basic strategy for low-maintenance tasks at CE projects requires two questions to be asked. First, in response to the complexities of soil, climate, and biotic interrelationships, is the plant community a natural one or one resulting from man's influence (Schmidt and Blaser 1969)? Second, what is the level of management required to maintain the vegetation? For example, what is required regarding mowing, fertilization and liming, soil modification due to compaction, control of weeds, and insect or disease control? Grassland species and varieties respond differently to the interplay of management and the environment. The site of best adaptation is one where species survive for long periods of time under prevailing soil, climate, and management conditions.

147. Strategies to reduce costs should be included in any low-maintenance vegetation program. The following are ways cost reductions can be accomplished.

- a. Large recreation meadow areas not subject to uses such as camping, picnicking, or ORV travel should be considered for private hay or grazing leases.
- b. Low public use areas adjacent to high public use areas should be maintained only to control unwanted brush, trees, or weeds.
- c. Lawns or turf areas should be maintained for a neat appearance, but kept free of weeds and other unwanted vegetation to reduce mowing times.
- d. Road rights-of-way should be maintained for a neat appearance and safety, but could be mowed only to maintain visibility from all directions.

- e. Selection of grass species should be based on their morphology and physiology to tolerate the conditions or degree of abuse under which they will be grown and used.
- f. Consult with horticultural and agronomic professionals for best selection of low-cost, low-maintenance grass species, conversion of large grassland areas to plantations, or the planting of ground covers and shrubs. This will require developing a basic landscape plan incorporating soils, micro-climate, and vegetation patterns.

148. Renovation. Renovation of turf or grassland areas should be considered when the stand of a desired grass has deteriorated to a degree that it cannot be improved by routine cultural practices (Holt 1969, Beard 1972). The main factors that can cause deterioration are soil compaction, changes in soil pH or nutrient status, mowing practices, shading, invasion of undesirable competing species, excessive thatch accumulation, and disease and insect damage. If the causative problem leading to deterioration is not corrected, the results of renovation will be short lived. Renovation requirements may be complete or partial depending upon need, size of the area, land use within the recreation area, and available funds and resources. Table 25 presents a general checklist with suggestions for renovation of grasslands.

149. A very economical way to control undesirable understory vegetation in woods or to renovate grasslands is to use controlled, or prescribed, burns. Timing of the burn will determine the amount and species that survive. This is especially effective in areas where undesirable hardwoods are invading pine stands, or where undesirable weedy and shrubby cover is occurring in grasslands. Controlled burns are quite effective in the restoration of prairie grasslands, for example. County foresters and range managers can assist with planning and carrying out prescribed burns, and also are generally willing to determine when an area can be benefitted by burning.

150. Mowing. Frequency of and height of mowing are governed by many factors, including growth habit, species choice, nutrient availability, soils, climatic conditions, equipment, and function or use of the area. Mowing management should be associated with seasonal environmental conditions, especially temperature and moisture (Madison 1962). Keen (1969) stated that most grasses are not benefitted by mowing and that they generally form dense turfs without mowing. Mowing frequency should be based on canopy heights rather than on a date or specific time frame such as at weekly or 10-day intervals (Schmidt and Blaser 1969). Growth rate after mowing is strongly influenced by

Table 25

Checklist for Renovation of Grasslands

<u>Steps Toward Renovation</u>	<u>Action</u>
<u>Diagnosis</u>	
Soil-related	
Soil pH	Test soil and lime if required.
Soil nutrients	Test soil and correct nutrient deficiency symptoms with fertilizer.
Soil compaction	Cultivate deeply.
Soil texture	Convert to another plant species.
Soil erosion	Control structures, isolate area, and reseed or replant.
Soil drainage	Convert to another plant species.
Disease or insects	Apply correct pesticides or disease controls or replant with resistant plant species.
Thatch buildup	On large areas, use a vertical mowing or mechanical renovator or harrow; on small areas, use a hand rake.
Undesirable plant species	Control with herbicide control or remove sod.
Terrain	
South-facing slopes	Convert to another plant species.
Steep slopes	Convert to another plant species.
Mowing	Increase mowing height during dry periods.
<u>Implementation</u>	
Selection of species	Refer to Appendix B, Coastal Zone Resources Division (1978), Landin (1978), Schiechl (1980), Doerr and Landin (1985), Allen and Klimas (1986), to match species with site properties.
Complete removal of existing sod	Strip with lawn or sod cutter or tractor-mounted blade; rake to remove stones, roots, and other debris.

(Continued)



Table 25 (Concluded)

<u>Steps Toward Renovation</u>	<u>Action</u>
Preparation of seedbed	Cultivate deeply, especially if area is compacted; add top soil, sand, or organic matter to correct soil surface and physical conditions (sand for clay soils and organic matter for sandy soils).
Planting, seeding, fertilizing	Refer to tables and references for additional information. Add fertilizer and lime according to soil tests; work fertilizer into the soil before seeding.
Control of persistent weeds, diseases, or insects	Use recommended herbicide or pesticide control.
Surface protection	Use mulches such as straw, hay, or sawdust.
Provision of adequate surface and subsurface drainage if needed	Consult with agricultural engineer experts.
Sodding	Can be carried out at any time of year; soils should be moist and area rolled immediately to ensure firm sod/topsoil contact.
Timing	Seed or plant in the spring and fall; soil temperatures should be above 10° C and soil moisture slightly less than field capacity.
Mowing	On sunny areas, mow to 5- to 7-cm heights; on shady areas, mow to 7- to 10-cm heights; mow only the leaf tips.
Top dressing	Apply two light applications of nitrogen at 1-month intervals to maintain grass vigor during establishment phase.

soil moisture, temperature, and light. Thus, frequency may range from weekly to monthly, depending on time of year. Frequent mowing will encourage thinning of the grass stand and allow more light to reach the soil surface. This encourages germination of weed species or drying out of the soil. Table 26 presents some general mowing guidelines.

151. Results of mowing research conducted by the Federal Department of Transportation show that mowing costs along highway rights-of-way can be reduced by various management techniques. First, mow only to drainage ditches, or half the distance to fences, or 7 m either side of the road shoulder. Second, mow vegetation at crossroads often to allow for safety and visibility. Third, on steep slopes use shrubs, vines, or low-growing herbaceous plants that do not require mowing. A number of these species are listed in Tables B2, B3, and B4. Fourth, raise mowing heights to allow 15- to 20-cm blade lengths, and mow when blade length is 25 to 30 cm. Fifth, develop a program of deferred mowing. For example, reduce total area and mow all areas once in the spring; zone road shoulders and intersections for blade-length mowing standards; and mow all areas once during the fall after growth ceases. It is also practical in some areas to maintain wooded areas on wide median strips or rights-of-way that do not require mowing at any time. Mowing in some areas while leaving others also provides much greater habitat diversity for wildlife through the provision of edge effect and cover along fencerows, wooded areas, travel corridors, and old field areas.

#### Ground cover and woody plants

152. Ground covers and trees and shrubs consist of both woody and herbaceous plants. Woody plants have aboveground portions that harden off, and they may or may not lose their leaves in winter. Their roots remain alive in a dormant state over the winter. Herbaceous perennial species usually have soft fleshy stems; the aboveground portions will die back to the ground each winter and regrow from roots in the spring. Herbaceous annuals will regrow from seeds each year.

153. Ground cover or woody species selection often is site specific because problem areas where these species are applicable are usually unique to each CE project site. Broad-leaf evergreens that have flattened leathery leaves are susceptible to drying out and should be planted in shady protected spots. Some ground covers which fit this habitat requirement are vines, such as English Ivy or bearberry. Narrow-leaf evergreens with needlelike leaves

Table 26  
Guidelines for Mowing Grasslands

<u>Areas</u>	<u>Recommendations</u>
<u>General</u>	
High-use area	Remove one-third or less of blade length at any single mowing; maintain 7- to 10-cm blade length.
Low-use area or shaded site	Maintain 10- to 15-cm blade length; mow when blade length is 15 to 20 cm.
Roadway shoulder	Maintain 15- to 20-cm blade length; mow when blade length is 25 to 30 cm.
<u>Cool-season grasses</u>	Maintain 7-cm blade length in spring months; exercise judgment with mowing during July and August to avoid heat and moisture stress. In the fall, maintain a 7-cm blade length.
<u>Warm-season grasses</u>	In spring and fall months, maintain a 5- to 7-cm blade length, and 7- to 10-cm blade length during periods of hot, dry summer months.
<u>Semiarid and arid regions</u>	
Fine-leaf fescues and bluegrasses	In high temperatures, maintain a 7- to 10-cm blade, and at high elevations or cool moist nights, maintain a 5- to 7-cm blade length.
Buffalograss and Bermuda grass	Maintain a 7-cm blade length.
Tall fescues, ryegrasses, plains bluegrass, wheatgrasses, and native bunchgrasses	Maintain a 10-cm blade length.
Bentgrasses, fine-leaf zoysias, and turf grasses	Maintain a 2.5- to 5-cm blade length.
Shaded areas	Maintain a 10-cm blade length.
<u>Warm, humid regions</u>	
Fine-leaf turf and centipede grass	Maintain a 2.5- to 5-cm blade length

(Continued)

Table 26 (Concluded)

Areas	Recommendations
<u>Warm, humid regions</u> (Continued)	
Tall fescue, St. Augustine grass, Bahia grass	Maintain a 5- to 7-cm blade length.
Shaded areas	Maintain a 10-cm blade length.
<u>Cool, humid regions</u>	
Kentucky bluegrass, fine-leaf fescues, tall fescue, rye- grass	Maintain a 5- to 7-cm blade length; exercise judgment during hot, dry weather.
Colonial bent- grasses, fine- leafed fescues	Maintain 2.5- to 5-cm blade length; exercise judgment during hot, dry weather.
Bermuda grass, zoysia grass, or other rhizomatous turf grasses	Maintain 2.5- to 5-cm blade length; exercise judgment during hot, dry weather.

such as junipers are less susceptible to drying effects of winter sun and wind and are very hardy under certain droughty and windy conditions.

154. Considerations in the selection of ground covers and shrubs are as follows:

- a. Appearance and growth rate. Color, texture, and form must harmonize and not distract from the existing setting. Plants may grow rapidly, become too large to manage, and become a maintenance liability instead of an asset.
- b. Plant's cold hardiness zone. For exposed areas such as open meadows next to buildings and roadways, select plants that are cold hardy.
- c. Location for the ground cover. Are the soils wet, dry, acidic, alkaline, or sandy, or is the site shady or sunny? Many plants are adaptable to a wide range of conditions but will require excess care if planted in sites less than optimum. The importance of knowing site conditions and stresses to which plants will be exposed cannot be overemphasized. Be sure that appropriate soil pH and nutrient tests have been made and that habitat requirements of the species have been met.

- d. Amount of care. Properly selected ground covers and woody plants often need little care once established. Wooded areas are especially easy to maintain after trees and shrubs have become established.
- e. Plan or planning map. This plan should outline areas that are amendable to shrub or ground cover plantings. Shrubs are appropriate for a variety of rural landscaping purposes: to mark boundaries between different land uses (hedges or living fences); to protect steep slopes from eroding; to serve as windbreaks and protect steep embankments that are hazardous for mowing; to screen around high-use areas and campsites; for shoreline protection around lakes or ponds; for landscape beautification; for wildlife habitat; to slow water movement to decrease sediment loads; and to serve as borders around woodlands for protection and wildlife cover. Ground covers may be more appropriate in areas that are difficult to seed with grasses, such as rocky or steep areas; adjacent to trails, paths, and buildings; as mixtures with shrubs; and in areas where grasses generally will not grow.

155. The best time to plant ground covers and woody plants is usually in the spring. Plants will have an entire growing season to become established. However, containerized plants can be planted any time the ground is not frozen. To determine the number of plants required on any site, first determine the size of area and availability of plant material. They may be available as seeds, balled-and-burlapped stock, bare-root, or container-grown plants. Large container-grown plants will cover an area faster than smaller plants or bare-root stock. For quicker coverage, plants should be planted at closer spacings (Doerr and Landin 1983).

156. If more than one species of ground cover or shrub is to be planted, a checkerboard or diamond-shaped planting pattern is usually best. Many ground-cover plants are available as seeds. Be sure seeds are free of weeds and have a good germination percentage. Once those seeds establish, seeds from the new plants can be collected and used in other areas. Initial plantings should serve as nursery areas. Planting of ground covers and shrubs on steep slopes may require mulching to prevent erosion and to keep the surface cool in sunny south exposures. Selected plant species should have vigorous growth habits and spread roots rapidly.

157. For container and balled-and-burlapped trees, shrubs, and ground covers, use the same procedures for hole preparation as bare-root stock. When planting balled-and-burlapped stock, place the plant in the hole, unfasten or cut the burlap, and fold it back into the hole. This will prevent wicking.

which can cause dryness, and root binding. When a container-grown plant is removed from the container, check the roots; if the roots are dense and encircling, make three to four vertical cuts into the root mass. This will cause roots to branch, which eliminates root circling when placed in the hole. Root circling can weaken the plant's stability and kill the plant. Backfill the hole and build a small mound around the outside perimeter of the hole to catch and store the water around the newly planted specimen. If shade-tolerant shrubs and ground covers are planted under trees or shrubs, be sure enough shade is present at the time of planting, or wait until adequate growth of the overstory provides enough shade.

158. Monitoring of groundcover, tree, and shrub establishment is essential. Mulching should be used on sites that are erodible, hot, and subject to drought. Straw or hay are acceptable; fresh woodchips should not be used in most cases. Wood chips compete with plants for soil nitrogen unless they are shredded and placed in a compost for a period of time to decompose. Peat moss is not suitable in most field situations because it dries out and rewets slowly, thus limiting rainfall penetration. Plastic films will prevent emergence of new shoots from roots, limiting the spreading of ground covers which root along procumbent stem nodes.

159. All plantings should be watered when planted, and after establishment as necessary. Often, temporary sprinkler irrigation equipment can be rented at a reasonable price, or trickle irrigation systems can be installed that will conserve water and meet the needs of the plants. Use soil tests to determine nutrient needs for new plantings. Generally, 5-10-5 or 5-10-10 all-purpose fertilizer is satisfactory. Fertilize during March or April and once during the fall months. The following guide is suggested for shrubs and trees:

- a. For 16-4-8 or 14-4-8 all-purpose fertilizers, use 1 tablespoon per 30 cm of shrub height. Sprinkle the fertilizer around the base of the plant to the dripline of the lowest branches.
- b. For shrubs or trees over 15 cm in diameter, use 1.36 kg of fertilizer per 2.5 cm of diameter. Using a 2.5- to 3.0-cm diameter bar, make 15- to 30-cm holes in the ground 0.7 to 1.0 m apart in a circle around the tree or shrub, starting at 1 m from the base of the tree or shrub and continuing to the dripline. Add fertilizer and soak with water. Fertilize (once a year) only those trees which show signs of nutrient stresses and are located in lawn areas adjacent to buildings or in other areas often seen by the public. For

shallow-rooted trees and shrubs, broadcasting of fertilizer may be sufficient.

160. Both ground covers and shrubs may need to be pruned to keep plants at manageable heights and sizes upon reaching maturity. Trees are not often pruned except to remove obstructive lower limbs in high-use areas or to repair storm damage. Pruning also aids in maintaining desired size and appearance; controlling irregular growth; compensating for root loss when transplanted; and removing dead, diseased, and damaged plant parts. Shrubs planted around entrance signs and buildings should be trimmed to keep from covering windows and signs. Remove all dead limbs and branches as a safety measure. All cuts should be to within 5 cm of the main branch and should be coated to prevent desiccation and invasion of insects and diseases. Allow shrubs or trees to grow in their original and natural shape, if possible.

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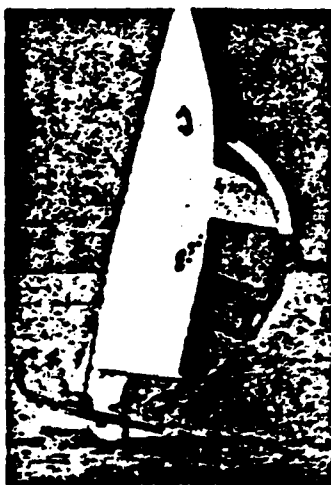
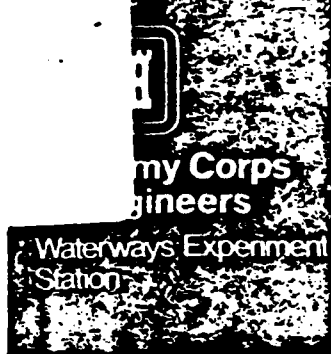
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Prairie Flower North Campground with planned prairie environment

## Low-Maintenance Prairie Restoration Demonstration at Saylorville Lake

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A low-maintenance turf and ground cover demonstration was initiated at a newly constructed group campground at Saylorville Lake. Saylorville Lake, located in central Iowa near Des Moines, is a flood-control and recreation facility in the Rock Island District. The project lies in the heart of the nation's original tall grass prairie zone. Today less than 1 percent of the state's original 30 million acres of prairie remain. The rich prairie soils are now used for producing corn and soybeans. Tall grass species dominated Iowa for 5,000 years, yet many Iowans and vis-

itors have never seen or experienced this lost heritage often referred to as "the sea of waving grass."

The 28-acre site, called Prairie Flower North Campground, was located on an old farmsite. Approximately 10 acres were still actively farmed for wildlife purposes, although no chemicals were allowed during the last growing season. Annual and perennial weeds dominated the remaining acreage. The campground, newly constructed in 1988, includes a planned restored prairie featuring tall grass species and wildflowers. A turf reflecting the low-



maintenance characteristics of the tall grass was also designed to create an aesthetically pleasing minimum-maintenance facility providing long-term substantial cost savings. The campground consists of 12 acres of turf and 14 acres of tall grass prairie. Included in this 14 acres of tall grass was a 30-foot perimeter of midlength grasses and forbs to soften the dramatic height differences between tall grass prairie and campground turf. This 30-foot perimeter is referred to as a transition zone. The campground has 112 campsites within 11 loops, accommodating from 4 to 18 camping parties in each loop. This design allows for a range of activities from small group and families to large club rendezvous. The goal of the design was to provide an aesthetically pleasing low-maintenance landscape capable of accommodating high-density use.

The restoration project consisted of three phases: planning, planting, and maintenance.

### Planning

The planning phase was accomplished with the assistance of the "Field Guide for Low Maintenance Vegetation Establishment and Management" (Environmental Laboratory 1986). This document specifically deals with the planning, layout, and establishment of low-maintenance ground covers. A detailed soil analysis was performed to determine soil characterization. Thirteen 1-cup soil samples were randomly collected throughout the location. The samples were analyzed for grain size, soil texture type, and fertilizer requirements. Also

measured were pH, phosphorus, potassium, calcium, magnesium, sodium, zinc, organic matter, and organic salts. This background information was important in formulating the planting plan and species selection. Planting maps were drawn which delineated low, medium, and tall prairie grass areas. To best typify the campground name Prairie Flower and to provide the unique experience of camping in a tall grass prairie, species selected were of common central Iowa prairie associations. Unfortunately grasses attaining 7-foot heights do not lend themselves to the turf needs of campgrounds. For that reason, a native warm-season grass was needed that met the criteria of being low growing and requiring minimum maintenance and yet still providing a usable turf.

Buffalo grass (*Buchloë dactyloides* (Nutt)) was selected because of its low-growing sod-forming capabilities. This species grows to a height of only 6 inches and spreads vegetatively creating a dense sod. This species was desirable as a selection for several other reasons. Minimum mowing requirements (after establishment) consist of a single mowing done in May to ensure uniform turf growth. Unlike most prairie species, buffalo grass is not overly sensitive to 2,4-D based broadleaf herbicides, permitting economical weed control. Once established, recommended chemical application is an annual spring application of simazine. Given the species' extensive north-south range throughout the Midwest, it was ideally suited for the turf needs of this particular project.

The tall grass species mix was designed from



Low-maintenance buffalo grass in 1988, one year after planting

plant inventories done on local prairie remnants located near the planting site that had similar soils and relief. The seed was secured from nearby producers to ensure survivability. Tall wildflower species were also selected to increase diversity and aesthetic quality.

To soften the dramatic height differences between the buffalo grass turf and the tall grass restoration, a transition zone was planned which consisted of three prairie grass species—blue grama, sideoats grama, and little bluestem. These midlength grasses attain a height of 3 feet. Wildflowers were purchased to be heavily planted in this transition zone. Thirteen species were selected that were consistent with area remnants. Planting at 4 pounds per acre should assure strong blooming within this transition zone. By selecting local forbs in accordance with flowering time and length of bloom, attractive displays can be expected from May through September.

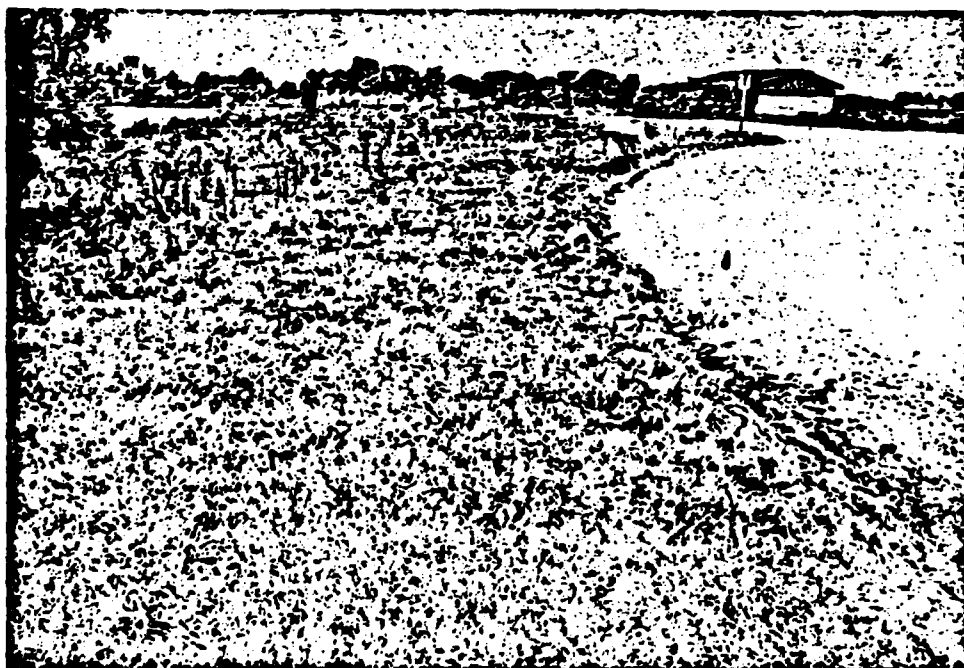
### Planting

The next phase of the project was planting. Native tall grass restorations take approximately three years to fully establish and dominate. Seed bed preparation is critical and was accomplished in the following phases. In fall 1987, the area was burned to destroy weed seeds and reduce vegetative cover. Prairie grasses need firm seed beds to ensure germination so plowing and disking is ideally done the fall prior to planting. This allows

for spring and early summer rains to naturally compact and firm the soil. Unfortunately wet conditions in the fall prevented turning the soil and this was delayed until the following April. To reduce the substantial weed competition present in the fallow fields, an application of 2 percent Roundup was applied when the area had developed a lush carpet of annual weeds in early May. A second application of Roundup was applied in late May approximately 10 days before planting.

To properly seed native tall grass species, a native grass planting drill is required. These special drills are designed to handle the fluffy nature of the seeds. Native grass drills are available for renting or borrowing from local conservation groups or State and Federal agencies. The tall grass species consisting predominately of big bluestem (*Andropogon gerardi*), Indian grass (*Sorghastrum nutans*), and little bluestem (*Andropogon scoparius*) were seeded at the recommended rate of 12-1/2 pounds per acre. The transition zone of midlength grasses was seeded at 7-1/2 pounds per acre with an additional mix of 4 pounds of wildflowers.

The buffalo grass was experimentally seeded at two rates—1/2 pound per 1,000 square feet and 1 pound per 1,000 square feet. This seeding was done with a power till seeder after experiencing calibration difficulties with the native drill seeder due to the asymmetrical shape of the seed burr of buffalo grass. Five days after planting, the



Drill-planted buffalo grass along campground roadways reduced mowing costs

12 acres of buffalo grass were treated with Princep (simazine) to provide additional weed control. The remainder of the restoration was not chemically treated due to the sensitivity of native species to chemicals.

The seeding was done the first week in June when soil temperatures had reached in excess of 60 degrees Fahrenheit at the 4-inch level. Warm-season species are best planted under these conditions and will germinate quickly provided adequate moisture is present. Planting before this time will only decrease germination potential as the seeds will lay there and become susceptible to rot. The buffalo grass germinated in 4 days, while the traditionally slower tall grasses germinated in 21 days.

### Maintenance

During the first growing season, mowing once or twice is the only required maintenance on tall grass restorations. Mowing is done to prevent excess shading of developing grass seedlings. Mowing height is critical and should be done in the 8- to 12-inch range so as not to disturb the seedling development. Foxtail flourishes under disturbed soil conditions; however, it does not prove detrimental to native grasses and helps provide a fuel base for the following spring burn. Because of heavy broadleaf weed infestation, the tall grass restoration was mowed twice at 12 and 14 inches.

The buffalo grass turf was chemically controlled with the original application of Princep followed by a late season application of Trimec. The area was mowed three times for purposes of establishment, in addition to the chemical controls. The mowing height was 5 inches. The areas seeded at 1 pound per 1,000 square feet produced a full sod in a single growing season. The areas seeded at 1/2 pound per 1,000 square feet still showed planting rows but are expected to close to full cover in the next growing season.

To quantify reduced maintenance costs, a comparison was done with the adjacent Prairie Flower South Campground, which has a cool-season turf consisting of a monoculture stand of falcon fescue. A historical record of this fescue cultivar within this campground averages twelve mowings per year. Based on 1988 contract mowing data (at \$24/acre mowing cost) annual mowing costs of 12 acres of campground would be \$3,480. When comparing the same acreage of turf established in buffalo grass and mowed once annually in the spring (cost \$298), the realized annual savings in mowing costs are projected at \$3,182.

Long-term management of the campground tall grass prairie consists of two consecutive years of spring burning, followed by a three-year burn cycle. Fire is an important management tool in prairie management. These prairie species are well adapted to fire and wildfires keep the prairie free of trees. The buffalo grass turf needs annual application of Princep at the label rate in the spring. This discourages cool-season competition.

### Results and Analysis

After a full growing season, the following conclusions have been drawn. Despite drought conditions in Iowa over the summer, tall species development was strongly evidenced by September. Sideoats grama was prevalent despite its low percentage in the restoration mix. This is common in central Iowa restorations, and it will lose its dominance after taller species become better established. Both seeding rates of buffalo grass were successful; however, the 1 pound of seed per 1,000 square feet produces a full sod in a single season. Once established, buffalo grass is highly tolerant to foot traffic. During establishment, traffic should be limited when possible.

Since all species selected in this restoration project are not shade tolerant, some arrangements had to be made to provide shade to campground users. To provide shade, hexagon shelters were constructed in each loop complete with picnic tables. Trees and shrubs were minimally used with two species present—bur oak (*Quercus macrocarpa*), which is a native oak with very thick bark capable of withstanding prairie fires, and grey dogwood (*Cornus racemosa*), which was considered an invader shrub on the prairie.

Buffalo grass seed averages \$13.00 per pound. When comparing the actual costs to establish this species as a turf, the following figures were calculated. Desiring full sod cover in a single year requires seeding rates of 43 pounds per acre (1 pound per 1,000 square feet). This represents a seed cost of \$560.00 per acre. In comparison, falcon tall fescue at \$1.50 per pound seeded at 150 pounds per acre has an estimated seed cost of \$225.00 per acre. Seed bed preparation costs will increase the actual costs of the fescue lawn. Buffalo grass needs no fertilizer to establish, and fertilizer is not required for maintenance. As with most native warm grasses, the use of fertilizer, unless perfectly timed, is detrimental due to absorption of nitrogen by undesirable weed species. Given the low maintenance costs associated with buffalo grass lawns, the ability to offset orig-

inal seeding costs can be accomplished in a single growing season.

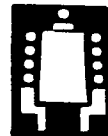
Two benefits of this restoration which are difficult to quantify are the aesthetic and wildlife values. Providing visitors with a visual taste of Iowa's lost heritage, a landscape of tall grasses and brightly colored flowers truly offers a unique experience within central Iowa. Wildlife attracted to the development will not only find quality habitat, but will also provide enjoyment to visitors.

With the assistance of the "Field Guide for Low Maintenance Vegetation Establishment and Management" developed under the Natural Resources

Research Program by the US Army Engineer Waterways Experiment Station, an aesthetically pleasing low-maintenance landscape is well under way to establishment. The long-term maintenance savings are expected to be substantial and the environment created will provide a unique experience to visitors camping or sight-seeing in the park.

### Reference

Environmental Laboratory. 1986. "Field Guide for Low Maintenance Vegetation Establishment and Management," Instruction Report R-86-2, US Army Engineer Waterways Experiment Station, Vicksburg, MS.



## Dugway presses tumbleweeds into service

**E**ach spring, millions of tumbleweeds roll across the Utah desert, piling up against anything in their way.

One of the things they pile up against is Dugway Proving Ground. For years, Dugway has fought these rolling pests, which can overwhelm fences and bury buildings. Besides being unsightly, the mounds of tumbleweed are a fire hazard.

Until the late 1980s, Dugway collected and burned the tumbleweed. Then Utah passed a very restrictive air quality law. Beginning in 1989, the installation had to pay for the equipment and manpower to gather the tumbleweeds and haul them off into

the desert. In two years, a mountain of tumbleweed accumulated.

In 1991, an employee suggested the installation use a haybaler to compress the troublesome weed. After workers adjusted the baler for the resilience of the weed, the suggestion proved a great success.

One bale of tumbleweeds equals 16 cubic feet of uncompressed weeds—four truckloads. Cleaning up a four-acre area used to require three man-weeks and 75 truck trips to the desert. With the baler, Dugway can clear the same area in two-and-a-half hours, generating fewer than 20 bales in the process.

The installation has sold the baled weed to a local oil company. People have also used the bales for:

- Erosion control.
- Patio furniture.
- Traffic control devices.

Dugway now keeps its grounds clear of tumbleweed for about \$10,000 less a year. And the grounds crew can devote more time to work other than dealing with tumbleweed.



*Tumbleweed piles up against a building at Dugway Proving Ground.*

**TO MOW OR NOT TO MOW - THAT IS THE QUESTION**

**American Society Of Agronomy**

**A-2 Division**

**Military Land Use And Management**

**November 26 - November 30, 1984**

**Las Vegas, Nevada**

**Julian Hutchinson  
Chief, Natural Resource Management  
Division  
Fort McCoy, Wisconsin**

(1)

MY NAME IS JULIAN HUTCHINSON. I AM CHIEF OF THE NATURAL RESOURCE MANAGEMENT DIVISION AT \* FORT MCCOY, WISCONSIN. THE TITLE OF MY PRESENTATION TODAY IS "TO MOW OR NOT TO MOW - THAT IS THE QUESTION". THE OBJECTIVE OF THIS PAPER IS TO ACQUAINT THOSE MOWING MILITARY GRASS WITH FORT MCCOYS ATTEMPT AT REDUCING THE AMOUNT OF MOWING ACREAGES. THESE REMARKS ARE MADE IN HOPES OUR SUCCESS TO DATE WILL ENCOURAGE OTHERS TO CONSIDER "MOWING LESS, NOT MORE". WE CALL IT THE "NO MOW" APPROACH. EVEN THOUGH IT IS RATHER SIMPLISTIC IN NATURE, I BELIEVE THERE IS A "THOUGHT PROCESS" OR ORGANIZATIONAL PROCEDURE TO FOLLOW IN ORDER TO DEVELOP AND IMPLEMENT A PROGRAM DESIGNED TO REDUCE MOWING ACREAGES. FORT MCCOY HAS ONLY BEEN INVOLVED IN "NO MOW" SINCE 1982, SO MY IDEAS ARE NOT THE FINAL WORD. ALSO, VARIOUS SOILS, CLIMATES, THE MILITARY MISSION AND GRASS SPECIES MAY PLAY DIFFERENT ROLES AT YOUR INSTALLATION AND THEREFORE ADJUST YOUR APPROACH, SO LET ME TELL YOU A LITTLE ABOUT FORT MCCOY.

FORT MCCOY IS A SEMI-ACTIVE, CLASS D FORSCOM INSTALLATION \* LOCATED IN WEST CENTRAL WISCONSIN APPROXIMATELY HALFWAY BETWEEN CHICAGO AND MINNEAPOLIS. THE INSTALLATION WAS ESTABLISHED IN 1909 AS A SMALL NATIONAL GUARD TRAINING SITE OF 14,000 ACRES AND A FEW BUILDINGS. AT THE OUTBREAK OF WW II, IT WAS EXPANDED TO 60,000 ACRES AND CONSTRUCTION OF FACILITIES TO SUPPORT A TWO DIVISION COMPLEX WERE COMPLETED. EXPANSION CONTINUED AND AT PRESENT \* MCCOY CONTAINS 1500 PERMANENT AND SEMI-PERMANENT BUILDINGS WITH \* 2100 ACRES OF IMPROVED GROUNDS.

FORT MCCOY HAS THREE PRIMARY MISSIONS. (1) IT RENDERS SUPPORT SERVICES FOR OVER 60,000 TROOPS IN A 9 STATE AREA (2) MAINTAINS AND \* SUPPORTS 117 RESERVE CENTERS LIKE THIS ONE IN MILWAUKEE AND OPERATES ON A YEAR AROUND BASIS WITH WINTER AND SUMMER TRAINING FOR ACTIVE, (3) RESERVE AND NATIONAL GUARD UNITS.

IN GENERAL, THE CLIMATE AT FORT MCCOY MAY BE CHARACTERIZED AS CONTINNENTAL.

\* SLIDE CHANGE

THE GROWING SEASON IS NORMALLY 130 DAYS IN LENGTH AND THE ANNUAL PRECIPITATION AVERAGES 31 INCHES. \* SEASONAL CHANGES ARE VERY APPARENT. EXTREME TEMPERATURES VARY FROM \* 30 DEGREES BELOW ZERO IN WINTER TO \* 100 DEGREES IN SUMMER.

FORT MCCOY IS LOCATED IN THE DRIFTLESS OR UNGLACIATED AREA OF WISCONSIN. TOPOGRAPHY IS \* CHARACTERIZED BY LEVEL PLAINS TO STEEP HILLS AND INTERMITTENT AREAS OF ROLLING TERRAIN. SOIL TYPES ARE PREDOMINANTLY FINE SANDS: ACIDIC, DROUGHTLY AND LOW IN ORGANIC MATTER AND NUTRIENTS.

FLORISTICLY, FORT MCCOY LIES IN A TRANSITIONAL ZONE OR ECOTONE BETWEEN THE CENTRAL HARDWOOD FOREST AND THE NORTHERN CONIFEROUS FOREST. FORESTED LAND COVERS APPROXIMATELY 47,000 ACRES, WHILE WILDLIFE HABITAT TOTALS OVER 57,000 ACRES. PRINCIPLE GAME SPECIES \* ARE WHITE TAIL DEER, GROUSE, WOODCOCK, SQUIRREL AND FURBEARERS.

\* THE SURFACE WATER RESOURCE IS OF HIGH QUALITY. \* 13 LAKES PROVIDE OVER 200 ACRES FOR BOTH COLD AND WARM WATER FISHERIES. \* OVER 70% OF THE 50 MILES OF STREAMS ARE CLASS I TROUT WATERS.

THE "NO MOW" PROGRAM AT MCCOY STARTED BY CATEGORIZING THE AREAS BEING MOWED. THE MAIN MOWING CATEGORIES ARE:

- \* 1. MAIN ENTRANCE ROADS
- \* 2. RANGES
- \* 3. TROOP HOUSING
- \* 4. AIRFIELD
- 5. AMMO STORAGE
- \* 6. NORMAL ROADSIDES
- \* 7. FAMILY HOUSING (OUTSIDE YARD LIMITS)
- \* 8. RECREATION AREAS AND OF COURSE
- \* 9. SPECIAL OCCASIONS



AFTER CATEGORIZING THE AREAS, EIGHT STEPS BECAME NECESSARY TO IMPLEMENT THE PROGRAM! THE FIRST STEP WAS TO ANSWER THE QUESTION "WHY MOW" FOR EACH CATEGORY. THE ANSWERS HELPED TO DEVELOP A LIST OF "MOWING CRITERIA". AT FORT MCCOY THE REASONS WE MOW GRASS ARE:

- TO PREVENT FIRE HAZARDS
- TO ELIMINATE INSECT HARBORAGE AREAS
- TO REDUCE RODENT AND SNAKE HABITAT
- TO CONTROL NOXIOUS WEEDS
- TO INCREASE VISIBILITY AT INTERSECTIONS
- TO CONTRIBUTE TO RANGE OPERATIONS
- TO ENHANCE APPEARANCE OF THE INSTALLATION AND
- TO BENEFIT MORALE OF THE WORKFORCE.

THE SECOND STEP WAS TO APPLY THESE "MOWING CRITERIA" TO EACH MOWED AREA. OBVIOUSLY, ANY MOWING WHICH DID NOT FULFILL ONE OR MORE OF THESE CRITERIA WAS A VALID TARGET FOR INCLUSION INTO A "NO MOW" PROGRAM. WE FOUND PARTS OF SOME AREAS SHOULD BE MOWED WHILE THE REMAINDER OF THAT AREA SHOULD NOT BE MOWED. STEP THREE WAS TO DESIGN THE BOUNDARIES OF EACH "NO MOW" SECTION AND STEP FOUR WAS TO PHYSICALLY STAKE THE CORNERS, SO MOWING OPERATORS COULD ACCURATELY MOW ONLY THE AREA WHICH JUSTIFIED MOWING. OF COURSE ALL OF THIS WORK WAS DONE PRIOR TO THE MOWING SEASON. STEP FIVE TOOK PLACE WHEN SIGNS WERE PLACED AT DESIGNATED LOCATIONS ON THE BOUNDARIES OF THE NO-MOW AREA. THE PURPOSE OF THESE SIGNS WAS TWO FOLD-ONE IT TOLD THE PUBLIC THAT THE AREA WAS NOT BEING MOWED ON PURPOSE AND TWO-IN SOME CASES IT WAS A REMINDER TO THE MOWING OPERATORS WHICH SIDE OF THE LINE IS "NO MOW" AND WHICH SIDE IS "MOW". \* OUR SIGNS READ "NATURE AREA, NO MOW". STEP SIX WAS TO CHECK TO MAKE SURE MOWING HAD STOPPED ON ALL "NO MOW" AREAS. EVEN THE MOST WELL CONCEIVED PLAN WITH THE BEST INTENTIONS, NEEDS CHECKING AND POSSIBLE ALTERATIONS. THEREFORE, STEP SEVEN WAS TO CHECK "NO MOW" AREAS AT LEAST MONTHLY TO SEE IF PROBLEMS DEVELOPED. ITEMS CHECKED INCLUDED MOST OF THE CRITERIA TO JUSTIFY MOWING IN THE FIRST PLACE, BUT MAINLY FOR UNACCEPTABLE FIRE HAZARDS, INSECT HARBORAGE, RODENT POPULATIONS AND NOXIOUS WEEDS. THE LAST ITEM WAS TO RECEIVE SEVERAL CALLS FROM "USERS"

MOST CALLS WERE COMPLIMINARY. HOWEVER ON OCCASION, THE ACTUAL USE OF AN AREA WAS NOT OBVIOUS DURING THE DESIGN STAGE. UNITS LATER REQUESTED MOWING OF A "NO MOW" AREA BECAUSE IT WAS PLANNED TO BE USED FOR COMPANY CLOSE ORDER DRILL, UNIT CEREMONIES, PT TRAINING OR AS A VOLLEY BALL COURT. SOME REQUESTS WERE VALID, SOME WERE NOT. VALID REQUESTS WERE RECOGNIZED AND THE "NO MOW" AREAS ADJUSTED. \* HERE ACCESS TO A MESS HALL WAS NEEDED.

IN SUMMATION -

THE STEPS REQUIRED IN THE ORGANIZATIONAL PROCEDURE TO DEVELOP "NO MOW" AREAS ARE:

1. DEVELOP MOWING CRITERIA FOR YOUR INSTALLATION
2. APPLY CRITERIA FOR EACH MOWED AREA
3. DESIGN "NO MOW" AREAS
4. STAKE BOUNDARIES
5. INSTALL SIGNS
6. ELIMINATE MOWING
7. CHECK MONTHLY AND
8. TAKE CALLS TO MAKE ALTERATIONS WHEN NEEDED.

THE ESTABLISHMENT OF "NO MOW" AREAS RESULTS IN BETTER MANAGEMENT OF NATURAL RESOURCES.

SPIN-OFF BENEFITS OF "NOT MOWING" INCLUDE:

1. INCREASES WILD FLOWERS (DON'T CALL THEM WEEDS)
2. IMPROVEMENT OF NONGAME HABITAT (ESPECIALLY SONG BIRDS)
3. INCOURAGES NATURAL ESTABLISHMENT OF TREE SEEDLINGS
4. PROVIDES ADDITIONAL PRECIPITATION RETENTION - AND OF COURSE
5. SAVES LABOR HOURS, FUEL AND MACHINE MAINTENANCE.

WHEN WE FIRST STARTED THE NO MOW PROGRAM, I THOUGHT THE BIGGEST OBJECTION WOULD BE THE UNSIGHTLY APPEARANCE OF THE GROUNDS ASSOCIATED WITH UNMOWED GRASS. THIS JUST DID NOT OCCUR. THE NATURAL AREAS HAVE A BEAUTY ALL THEIR OWN.

LET ME SHOW YOU WHAT ACTUALLY HAPPENED AT MCCOY. \* THIS IS A MAP OF THE MAIN CANTONMENT AREA. THE MAROON AREAS WERE ALL MOWED AT VARIOUS FREQUENCIES AS LATE AS 1982. THEY ARE NOW THE "NO MOW" AREAS. I HAVE SEVERAL SLIDES TAKEN AT DIFFERENT TIMES IN 1983 AND 1984 TO SHOW PICTURES OF REPRESENTATIVE POINTS AND ILLUSTRATE WHY UNMOWED GRASS DOES NOT ALWAYS LOOK UNSIGHTLY.

POINT ONE IS JUST OFF A PARKING AREA,

POINT TWO IS NEXT TO TROOP HOUSING,

POINT THREE IS JUST INSIDE THE MAIN GATE,

POINT FOUR IS BEHIND THE PX GAS STATION,

POINT FIVE IS ALONG THE MAIN HIGHWAY TO POST HEADQUARTERS, AND

POINT SIX IS ALSO ALONG THE MAIN HIGHWAY TO HEADQUARTERS.

LETS GO BACK AND LOOK AT EACH OF THESE SITES.

\* THIS PICTURE WAS TAKEN BEHIND A PARKING LOT AT POINT ONE ON 11 MAY 1983. IT HAD BEEN IN NO-MOW THE YEAR BEFORE. OTHER PICTURES WERE TAKEN ON \* 7 JUNE 1983, \* 21 July 83, \* 22 Aug 84 AND \* 17 OCTOBER 84. NOTICE WE MOW AROUND ALL PARKING LOTS FOR FIRE CONTROL. POINT TWO, THE AREA NEXT TO TROOP HOUSING. \* THIS WAS TAKEN ON 11 MAY, 1983. NOTICE THE STAKES LEFT FROM THE PREVIOUS YEAR. \* THEN 7 JUNE 83, \* 25 JULY 83, \* 22 . AUG 84 AND \* 17 OCTOBER 84.

\* THE NEXT PICTURE POINT 3, BY THE MAIN GATE, WAS TAKEN ON 11 MAY 83. THEN \* 7 JUNE AND \* 21 JULY 1983 AND \* 22 AUG AND \* 17 OCTOBER, 1984.

THE NEXT SPOT POINT 4, WAS BEHIND THE PX GAS STATION. \* FIRST PICTURE WAS TAKEN ON 11 MAY, 83, \* THEN 7 JUNE 83. THIS YEAR A PICTURE WAS TAKEN ON \* 22 AUG.

THE NEXT AREA POINT 5, CAN BE SEEN FROM THE MAIN ROAD TO HEADQUARTERS. \* FIRST PICTURE ON 7 JUNE 83, THEN \* 21 JULY 83, AND FINALLY ON \* 22 AUG 1984. NOTICE THE INCREASE IN THE SIZE OF THE AREA.

\* THE LAST AREA RECORDED POINT 6, IS ALSO ALONG THE MAIN ROUTE TO HEADQUARTERS. PICTURE WERE TAKEN ON 21 JULY 1984 AND THEN THIS YEAR ON \* 22 AUG AND \* 17 OCT. UNMOWED GRASS DOES NOT LOOK BAD WHEN IT IS A PART OF A PLANNED OPERATION.

FORT MCCOY STARTED THE NO MOW PROGRAM IN 1982 BY NOT MOWING 22 ACRES IN 9 PLACES PREVIOUSLY MOWED. IN 1983 THE ACREAGE INCREASED BY 100 ACRES ON 48 SITES. THIS YEAR WE ADDED ANOTHER 465 ACRES ON 43 SITES FOR A PRESENT TOTAL OF 587 ACRES IN 91 SEPARATE NO MOW AREAS. WE NOW MOW ONLY 2,139 ACRES INSTEAD OF THE 2,726 ACRES HAD WE NOT IMPLEMENTED THE NO MOW PROGRAM. THIS ENABLES US TO DO A BETTER JOB OF MOWING WHERE WE SHOULD BE MOWING. IN FY 85, LABOR REDUCTIONS WILL BE POSSIBLE AND WILL RESULT IN A POSITIVE SAVINGS. WE EXPECT TO EXPAND THE PROGRAM EVEN FURTHER IN FUTURE YEARS.

\* I ENCOURAGE ALL OF YOU TO LOOK AT YOUR OPERATIONS AND SERIOUSLY CONSIDER THE IMPLEMENTATION OF A NO-MOW PROGRAM.                      THANK YOU

ARE THERE ANY QUESTIONS?

STORY, PHOTO  
By PIC. SCOTTEVERS

"Watch Us Grow Wild," is a sign of the times along some Fort Sill roads. The post's Natural Resources Branch of the Directorate of Public Works is joining forces with Army-wide environmental planners to naturalize some previously groomed areas on military installations.

"We're placing signs along the roads where the no-mowing areas are planned to let post residents and the public know we haven't forgotten to mow," said Gene Stout, Natural Resources branch chief.

Land management experts from Waterways Experiment Station, Vicksburg, Miss., visited Fort Sill recently to share naturalization ideas with the post's horticultural professionals. Linda Peyman, W.E.S. landscape architect, and Terry Carroll, range conservationist with the post's Land Management Section, said the idea is part of a research program which is attempting to find out if installations and the public are open to rethinking grounds maintenance techniques.

"We're trying to create a new management philosophy that not everything on a military installation has to be manicured. The problem is, when a post like Fort Sill has always been so carefully groomed, it's difficult to create large native areas and have the public immediately accept them. We're interested in finding



**WILDFLOWERS.** One of the recently-designated "no mowing" areas on post is discussed by, from left, Linda Peyman, Terry Carroll and Roosevelt Danna.

out how the public likes the new look," she said.

Peyman discussed several benefits associated with allowing previously groomed areas to grow up in a natural state.

"Fort Sill will have different ecological areas, more habitats for wildlife, and in my opinion, it will improve the aesthetics and beauty of the environment," she said.

Natural resources officials see several practical benefits of eliminating grounds maintenance in the no-mowing areas.

"We can put that effort into other areas like

tree and shrub maintenance elsewhere on post. Right now, we lose up to 40 percent of the young trees we plant each year, because we don't have the manpower or time to care for all of them," said Roosevelt Danna, grounds maintenance foreman, DPW.

"And Fort Sill will save money in the areas that are usually mowed every three weeks during the growing season. We'll be able to calculate how much time and money is saved after we take those areas out of the mowing schedule and see how much fuel and labor is saved," he said.

Stout agreed the no-mowing plan will prove practical for the post's grounds maintenance personnel, "but it is also a part of the growing mood around the country to try to give wildlife a break. We think that if this program makes it or breaks it will not be based on money. It's the right thing to do for all the right reasons."

"As long as I've been here we've been expending the maintenance area and moving out into what was once wild country. As we grew, we mowed. Now, we are just letting some of those areas return to their natural state — bringing back natural beauty and wildlife to the maintenance area."

Stout explained exactly how the program will work.

"Basically, we're letting the native grasses, wildflowers, trees and shrubs grow in a natural state. We'll introduce some wildflowers and

See GROW, Page 2A

## Grow

From Page 1A

native trees as time goes on, but the only artificial maintenance we plan for these areas is to control Johnson grass, which is not native to the prairies. This will allow the native grass and flower species to grow and reproduce without competition," he said.

Fort Sill is an ACOE winner because it has always been a leader in new thinking about preserving our environment, Stout said. "In 1976, when we first had the idea to

preserve the Martha Songbird area in the middle of post, many nay-sayers thought it would be an ugly swamp, but now, 15 years later, it is a part of our post and we're proud of it.

"We're breaking a tradition, but it doesn't mean we have to be ugly — wild is beautiful," he said. "I am asking the public to be patient — these areas may look a little scraggly the first few months of the growing season, but after a year or so of allowing the native species to reassert themselves, these areas will be beautiful."



RANDY STOTLER/staff

Terry Carroll, range conservationist with Fort Sill's Land Management Section, examines grasses and wildflowers which are being allowed to "Grow Wild" at Fort Sill.

## Fort Sill 'Goes Wild' with new program



RANDY STOTLER/staff

Signs like this one inform the public about the back-to-nature program.

By AMY R. CARTER/Staff writer

Forget the close-cropped image usually associated with the military: when it comes to large, grassy areas, the new motto at Fort Sill is "let it grow."

Terry Carroll, range conservationist with the post's Land Management Section, said the post has embarked on a "Grow Wild" program designed to save grounds maintenance costs and beautify the post by allowing some previously mowed areas to revert to their natural state.

Post environmental and grounds maintenance workers

See Fort, Page 2A

# Fort Sill begins back to nature program in certain parts of post

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will work together on the program. Carroll said officials will try to allow the areas to go "back to nature" in a way which is good for the community. The program is part of an Army-wide environmental plan to naturalize some previously groomed areas at military installations.

Under the program, Carroll said "in between areas" — large expanses of ground between built-up areas — will be allowed to grow up. The re-emergence of naturally occurring grasses and plants will be encouraged. However, grounds maintenance workers will "spot treat" areas of Johnson grass, which is not native to the region.

Noting that the military often equates natural beauty with manicured lawns, Carroll said environmental officials are working with the post public affairs office and also setting out "Fort Sill is going wild" signs to stimulate public and official interest in the program.

"We're trying to change the perception of what beautiful is," Carroll said.

Carroll said land management experts from Waterways Experiment Station, Vicksburg, Miss., approached the post about the program and have been providing their expertise in determining what plants should be allowed to grow. Post officials also will be erecting signs designed to inform visitors about the prairie ecological system.

The program will have several benefits, Carroll said.

In addition to the sheer beauty of wildflowers and tall waving grasses, the program will reduce mowing costs.

It will also free up some grounds maintenance workers from mowing for other tasks. Carroll said the post loses up to 40 percent of the young trees it plants each year because there are not enough workers to provide proper watering and maintenance.

The program could increase the post's tree population in other ways as well. Carroll said in unknown areas, some shrubby plants and wild trees will sprout naturally.

"When you think about it, it makes for a prettier cantonment area," Carroll said.

Asked if officials are concerned about snakes and other animals taking advantage of the high grass, Carroll said the post has not had any significant problems with any freely growing area located near a housing area.

"Obviously, if we run into big disturbances we will have to act on that," Carroll said. "We have no intention of subjecting anyone to anything harmful."

It will take a number of years for the native species to "perk back up," but the results should be worth the wait, Carroll said.

"It may look a little scraggly now, but if (people) bear with us for a while, I think it will look nice in the future," he said.

He also initiated an ecological demonstration program at the suggestion of Ron Jones, foreman of grounds and structures.

In a general discussion of ways to become better stewards of the environment, Jones asked a simple question, said Wardwell. "Is our maintenance excessive?" The answer was, "Yes."

"Well," Jones added, "is it possible to offer a more diverse habitat for birds, plants and animals if we change the ways we maintain the grounds?"

The answers were simple, said Wardwell. They required only small changes in the way we do grounds maintenance and, oh yes, a major philosophical reorientation.

Wardwell, the Facility Engineer Ray Roudebush, and his boss, Theresa Kines were in favor of giving it a try. They were fully supported by Jerry Reed, HDL director, and Col. Stephen Young, chief of staff and installation commander.

"Innovation and stewardship require risk," Wardwell says firmly. "We need to change our thinking about what is beautiful and consider what is environmentally sound thinking. There is no real justification for not trying new ideas. We can rehabilitate the habitat and improve the ecological integrity of the installation.

"This could be a real plus," he added, "as ALC works to achieve recognition as an Army Community of Excellence."

And so grow the dandelions, mudwort, toadstools and wild grasses.

Finally, and perhaps most important, we can minimize our use of pesticides, Wardwell asserts.

"But," Wardwell says, "all inhabitants of the installation need to be aware of what is happening. We all need innovation in our thinking. Are dandelions a problem or are the pesticides we use to kill them a problem?"

Earth Day was April 22. Maybe nobody else noticed, but for Bob Wardell, every day is committed to improving his (and our) small corner of the planet. Dandelions and all.

## ALC returns to the wild

By Cathy Coleman

HDL Public Affairs

The roadside grass is becoming more unkempt than in springs past.

The return to nature is part of a plan conceived by Bob Wardwell, Harry Diamond Labs' management agronomist and Ron Jones, foreman of the Grounds & Structures shop. As a specialist in dealing with flora and fauna, Wardwell oversees the care of and planning for the ALC, Woodbridge and Blossom Point sites, keeping an eye on such details as soil composition, vegetation and wildlife populations, and their dependence upon each other.

As the previously-mowed areas begin to rejuvenate, observers will see a return of wildflowers, honeysuckle, greenbrier, and even blackberry bushes; over the long term, trees will eventually grow up closer to the road, although Wardwell says the pine, juniper and other varieties will take several years to come back.

The advantages of this cessation of mowing will be even more evident as the area wildlife becomes more abundant at all three sites. This will include not only the deer but also a variety of birds and smaller wildlife such as rabbits, squirrels and snakes, which feed on the area's rodents, said Wardwell.

"We have a significant diversity of wildlife," says Wardwell, "and this will benefit them by improving their habitats."

Wardwell also points out that this new policy will eliminate any need for fertilizer, pesticides or lime, the last being used to balance the pH of the area's acidic soil to accommodate the grasses planted.

Wardwell said there will be some economic savings associated with the plan. More significant, he added, is that ALC's two full-time grounds-keeping employees will now be able to focus most of their attention on the installation's "improved grounds." This includes the cultivated areas where the non-native trees, grass and shrubs need constant attention to maintain the well-manicured appearance befitting a headquarters installation.

"I just hope," says Wardwell, "that people understand that this is a well-thought-out plan to maintain our sites in a way that balances the needs and desires of the employees with the requirements of the species which share the areas. It will benefit all of us in the long run."



## PEOPLE

# Adelphi Laboratory Center returns landscape to nature

by Marlan Singleton  
LABCOM Public Affairs

It's time to go to work. You reluctantly leave the haven of your car, plod across an asphalt parking lot and struggle to get your mind in gear. No time to think about the lush grass on the lawns or the flowering trees that shade the base of the flagpole. And Dandelions? Forget it.

Someone, however, does think about

that kind of thing. Bob Wardwell, management agronomist with Facilities Engineers, doesn't just think about grass and dandelions. he acts on behalf of plants, animals and the total installation environment.

"Adelphi Laboratory Center is a microcosm," Wardwell says. "It has fish and wildlife, forest, land management issues,

pest management and soil conservation. These are the pillars of the natural resources program."

Wardwell is a returnee to ALC. Following graduation from the University of

Maryland with a major in ornamental horticulture, he spent a year with the National Park Service, climbing trees, pruning trees and maintaining trees. He spent another year with the Library of Congress doing grounds maintenance and then began his sojourn with Harry Diamond Lab's as a gardener on roads and grounds. In 1980, the job was professionalized and he became a management agronomist, serving in that capacity until 1982.

Wardwell left Adelphi to serve in the Office of the Deputy Assistant Secretary of Defense for Environment as a member of the Armed Forces Pest Management Board.

"I was a bureaucrat," Wardwell says. "I wrote policy on endangered species, I drafted DoD directives, I did a lot of interagency coordination and prepared material for Congressional staffs."

"In 1989, the Secretary of Defense instructed DoD to be an environmental leader," he says, "and Defense has tried to demonstrate environmental leadership. But implementation can only come at the installation level and things sometimes get lost in translation."

When the opportunity came to return to Adelphi, Wardwell snapped it up. "I felt that I understood the intent of DoD and I hoped I could help."

He has since initiated the development of a storm water management plan in conjunction with the Baltimore District Corps of Engineers. He reasoned that even a small improvement in the overall health of the creek that runs through ALC contributes to the greater good. Paint Branch creek is a tributary of the Anacostia River.

"By eliminating run-off and sediment transport, we can contribute to the restoration of the Anacostia River Basin," Wardwell said.



Photo by Ben Mitchell

Bob Wardwell, ALC management agronomist.

LOCATIONS ARE DEPICTED ON ATTACHED SITE MAP

**18"-24" SIGNS**

**NO-MOW AREA, ECOLOGICAL CONSERVATION PROJECT**

**36"-60" SIGN**

THIS AREA IS NOT BEING MOWED IN ORDER TO PROVIDE A MORE DIVERSE HABITAT FOR WILDLIFE AND PLANTS. THE ROADSIDES WERE PREVIOUSLY MAINTAINED AS TURF AND THIS RESULTED IN A DECREASE IN BIODIVERSITY. BY ELIMINATING THE USE OF MOWERS, FERTILIZERS, AND PESTICIDES, THIS AREA HAS REVERTED BACK TO A MORE NATURAL ENVIRONMENT WITH AN INCREASE IN BIRDS, SMALL RODENTS, DEER AND PLANT SPECIES. THIS NATURAL RESOURCES INITIATIVE IS IN KEEPING WITH THE ARMY RESEARCH LABORATORY AND DEPARTMENT OF ARMY'S COMMITMENT TO BEING GOOD STEWARDS OF THE LAND RESOURCES PLACED UNDER THEIR CARE BY THE CITIZENS OF THE UNITED STATES.